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REMARKS

An Excess Claim Fee Payment Letter is submitted herewith for two (2) excess total claims.

Claims 7-26 are all the claims presently pending in the application. Claims 25-26 have been added.

It is noted that the claim amendments are made only for more particularly pointing out the invention, and not for distinguishing the invention over the prior art, narrowing the claims or for any statutory requirements of patentability. Further, Applicant specifically states that no amendment to any claim herein should be construed as a disclaimer of any interest in or right to an equivalent of any element or feature of the amended claim.

Applicant gratefully acknowledges the Examiner's indication that claims 13, 14, 19, 20, 23 and 24 are allowed. However, Applicant respectfully submits that all of the claims are allowable.

Claims 7, 9, 15 and 17 stand rejected under 35 U.S.C. § 102(e) as being allegedly anticipated by Fujimoto et al. (US 2003/0180617).

Claims 7-12, 15-18, 21 and 22 stand rejected under 35 U.S.C. § 102(e) as being allegedly anticipated by Nakanishi et al. (US 2002/0061443).

These rejections are respectfully traversed in view of the following discussion.

I. THE CLAIMED INVENTION

An exemplary aspect of the claimed invention (e.g., as recited in claim 7, and similarly recited in claims 8, 11, 12, 15 and 16) is directed to a positive active material including a composite oxide which includes lithium (Li), manganese (Mn), nickel (Ni), cobalt (Co), and oxygen (O) and is represented by the following chemical composition formula: $\text{Li}_a\text{Mn}_b\text{Ni}_c\text{Co}_d\text{O}_e$, where $0 < a \leq 1.3$, $|b-c| \leq 0.05$, $0.6 \leq d < 1$, $1.7 \leq e \leq 2.3$, and $b+c+d=1$ (Application at page 13, line 9-page 16, line 21). These features may help to ensure a high-rate discharge performance and inhibit an increase in a high-temperature charge capacity (Application at page 14, lines 12-16; page 16, lines 15-17). In addition, the composite oxide shows a single-phase structure belonging

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to space group R3-m as a result of examination by X-ray diffractometry (Application at page 46, lines 23-25).

Another exemplary aspect of the claimed invention (e.g., as recited in claims 11 and 12) is directed to a non-aqueous electrolyte battery, including a positive electrode which includes a lithium-manganese oxide (A) having a spinel structure and represented by the general formula LiMn_2O_4 and a lithium-nickel-manganese-cobalt composite oxide (B) having an $\alpha\text{-NaFeO}_2$ layer structure and represented by the general formula $\text{Li}_a\text{Mn}_b\text{Ni}_c\text{Co}_d\text{O}_e$.

Importantly, in this exemplary embodiment, a weight ratio of (A) to (B) is in a range from 5:95 to 10:90 (Application at page 83, lines 18-22).

II. THE ALLEGED PRIOR ART REFERENCES

A. Fujimoto

The Examiner alleges that Fujimoto teaches the invention of claims 7, 9, 15 and 17. However, Applicant submits that there are features of the claimed invention that are not taught or suggested by Fujimoto.

In particular, Fujimoto does not teach or suggest a composite oxide which includes lithium (Li), manganese (Mn), nickel (Ni), cobalt (Co), and oxygen (O) and is represented by the following chemical composition formula: $\text{Li}_a\text{Mn}_b\text{Ni}_c\text{Co}_d\text{O}_e$, where $0 < a \leq 1.3$, $|b-c| \leq 0.05$, $0.6 \leq d < 1$, $1.7 \leq e \leq 2.3$, and $b+c+d=1$, as recited, for example, in claim 7 and similarly recited in claim 15 (Application at page 15, line 20-page 16, line 21). As noted above, this may help to ensure a high-rate discharge performance and inhibit an increase in a high-temperature charge capacity (Application at page 16, lines 15-17). In addition, nowhere does Fujimoto teach or suggest a composite oxide which shows a single-phase structure belonging to space group R3-m as a result of examination by X-ray diffractometry (Application at page 46, lines 23-25).

Clearly, this feature is not taught or suggested by Fujimoto.

Indeed, Applicant submits that the claimed invention is patentable (e.g., as "a selection invention") at least since a specific range of compositions selected from the broader range of compositions disclosed as the broader concept by Fujimoto has been found to produce

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unexpected and outstanding results. Therefore, claims 7, 9, 15 and 17 are neither anticipated by, nor obvious over Fujimoto.

While Fujimoto et al shows the general formula $\text{Li}_a\text{Mn}_b\text{Ni}_c\text{Co}_{1-2b}\text{O}_2$ in paragraph [0010] thereof, specific compositions shown in the description of Examples are only $\text{LiMn}_{0.33}\text{Ni}_{0.33}\text{Co}_{0.33}\text{O}_2$, $\text{LiMn}_{0.4}\text{Ni}_{0.4}\text{Co}_{0.2}\text{O}_2$ and $\text{LiMn}_{0.5}\text{Ni}_{0.5}\text{O}_2$. These compositions correspond to those represented by the general formula $\text{Li}_a\text{Mn}_b\text{Ni}_c\text{Co}_d\text{O}_e$ recited in claims 7, 9, 15 and 17 of the present application, when $|b-c| = 0$ and d is 0.33, 0.2 or 0.

Fig. 1 below is a graph obtained by plotting at \bullet the values of "Capacity Ratio (%)" shown in Table 5 of Fujimoto along the abscissa axis indicating the values of d .

It appears that all the compositions in which d was 0.33 or less were known from Fujimoto et al. LiCoO_2 was also known when the present application was filed. Thus, Table 2 in the present application appears may be assumed (arguendo) to include two known compositions, $\text{LiMn}_{0.42}\text{Ni}_{0.42}\text{Co}_{0.16}\text{O}_2$ and LiCoO_2 and the High-Rate Discharge Performance Values (%) of those compositions are plotted at \blacktriangle in Fig. 1. The two kinds of values show good coincidence in the vicinity of the point at which d is 0.2. Probably the high-rate discharge performance values (%) of the level shown in Fig. 1 cannot be said to be unobvious.

Fig. 2 below has been obtained by adding to Fig. 1 the other compositions shown in Table 2 in the present application and conforming to the general formula of Fujimoto et al, $\text{Li}_a\text{Mn}_b\text{Ni}_c\text{Co}_{1-2b}\text{O}_2$. As is apparent from Fig. 2, the compositions as defined by claims 7 and 9, in which $0.6 \leq d < 1$, exhibit remarkably improved high-rate discharge performance values (%) among the compositions broadly defined as broader concept by the general formula of Fujimoto et al, and the degree of their improvement is by far greater than can be expected from the compositions of Fujimoto et al and the known compositions.

Moreover, the limitation " $0.6 \leq d < 1$ " of claims 7 and 9 makes it possible to restrain the high-temperature charge capacity increase (%). Fig. 3 below has been obtained by plotting the values of high-temperature charge capacity increase (%) from Table 2 in the present Application. While Fujimoto et al is silent about the high-temperature charge capacity increase (%), and assuming (arguendo) that the values of high-temperature charge capacity increase (%) of the

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known compositions ($d \leq 0.33$ or $d = 1$) may be obvious, Fig. 3 confirms that the values of high-temperature charge capacity increase (%) of the compositions of claims 7 and 9 ($0.6 \leq d < 1$) are by far smaller than can be said to be obvious.

Thus, it would not have been obvious to expect the remarkably improved high-rate discharge performance values (%) and the remarkably reduced high-temperature charge capacity increase (%) from the limitation " $0.6 \leq d < 1$ " as recited in claims 7 and 9 of the present application. Therefore, claims 7 and 9 of the present application are allowable (e.g., at least as being directed to "a selection invention"), and would have been neither anticipated by, nor obvious from Fujimoto.

Fig. 1

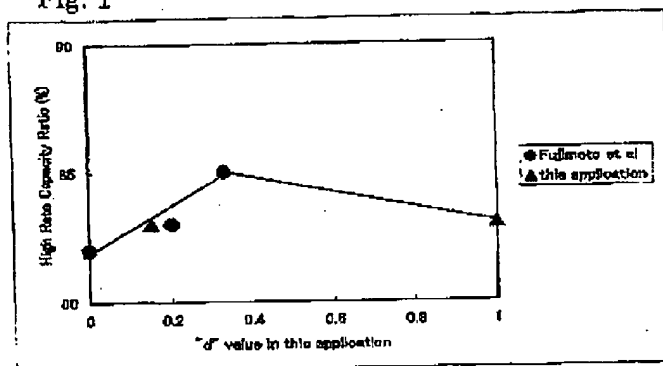
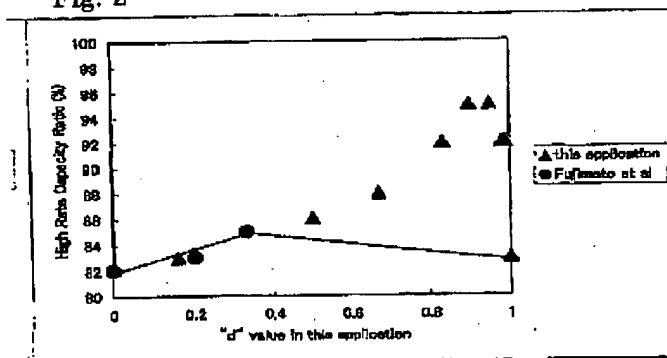


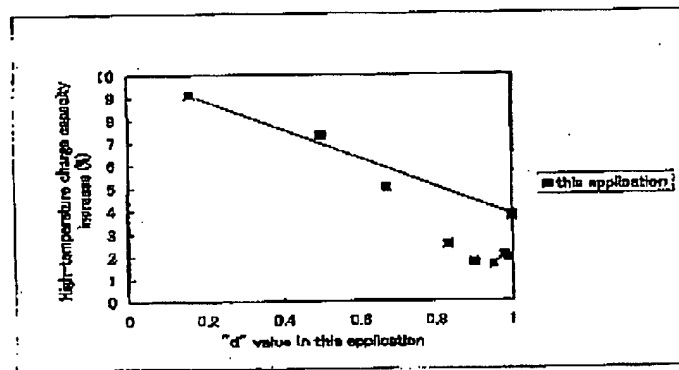
Fig. 2



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Fig. 3



Claims 15 and 17, which limit claims 7 and 9 to a further extent, would have been neither anticipated by, nor obvious from Fujimoto. For additional results of claims 15 and 17 over those of claims 7 and 9, i.e. the technical meaning of the limitation " $d \leq 0.833$ ", reference may be made to page 11, line 5 from bottom to page 16, line 8 of Applicant's arguments included in the Amendment filed herein on February 28, 2007.

In addition, the Examiner alleges on page 3 of the Office Action that the oxide of Fujimoto would inherently include a single-phase structure belonging to space group R3-m.

However, even assuming (arguendo) that the products obtained by using the production method as described in Fujimoto or Nakanishi may at least partially include "a structure belonging to space group R3-m", Applicant would point out that the present Application describes an exemplary aspect of the claimed invention stating "[a]s a result of examination by X-ray diffractometry, the powder obtained was found to have a single-phase structure belonging to space group R3-m". In particular, in the working examples, the composite oxide of the claimed invention has a high purity to such an extent that whole of composite oxide may be recognized as "a single-phase structure belonging to space group R3-m" in view of the "result of examination by X-ray diffractometry", even when the composite oxide includes the other structure as an impurity.

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That is, an exemplary aspect of the claimed invention may eliminate a low purity composite oxide including a structure other than "a single-phase structure belonging to space group R3-m" to such an extent that a peak belonging to the other structure is recognized in a group of peaks observed as a result of examination by X-ray diffractometry. Nowhere is this taught or suggested by the cited references.

Therefore, Applicant respectfully submits that there are features of the claimed invention that are not taught or suggested by Fujimoto. Therefore, the Examiner is respectfully requested to withdraw this rejection.

B. Nakanishi

The Examiner alleges that Nakanishi teaches the invention of claims 7-12, 15-18, 21 and 22. However, Applicant submits that there are features of the claimed invention that are not taught or suggested by Nakanishi.

In particular, Nakanishi does not teach or suggest a composite oxide which includes lithium (Li), manganese (Mn), nickel (Ni), cobalt (Co), and oxygen (O) and is represented by the following chemical composition formula: $\text{Li}_a\text{Mn}_b\text{Ni}_c\text{Co}_d\text{O}_e$, where $0 < a \leq 1.3$, $|b-c| \leq 0.05$, $0.6 \leq d < 1$, $1.7 \leq e \leq 2.3$, and $b+c+d=1$, as recited, for example, in claim 7 and similarly recited in claims 8, 11, 12, 15 and 16 (Application at page 15, line 20-page 16, line 21). As noted above, this may help to ensure a high-rate discharge performance and inhibit an increase in a high-temperature charge capacity (Application at page 16, lines 15-17). In addition, Nakanishi does not teach or suggest a composite oxide which shows a single-phase structure belonging to space group R3-m as a result of examination by X-ray diffractometry, as recited, for example, in claims 7, 8, 15 and 16 (Application at page 46, lines 23-25). Further, Nakanishi does not teach or suggest a weight ratio of (A) to (B) is in a range from 5:95 to 10:90, as recited, for example, in claims 11 and 12 (Application at page 83, lines 18-22).

Clearly, Nakanishi does not teach or suggest these features.

Indeed, the composite oxide $\text{Li}_a\text{Mn}_b\text{Ni}_c\text{Co}_d\text{O}_e$ ($b+c+d=1$) employed in the claimed invention is characterized by having at least the limitations " $|b-c| \leq 0.05$ " and " $0.6 \leq d < 1$ " and may

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also show "a single-phase structure belonging to space group R3-m as a result of examination by X-ray diffractometry".

The compositions shown specifically by Nakanishi include Positive Electrodes 1, 3 and 8 which the Examiner may consider as being close to those of the claimed invention (e.g., see TABLE 1 in Nakanishi).

However, claims 7-10, 15-18, 21 and 22 in the present application are neither anticipated by, nor obvious over Positive Electrode 1 of Nakanishi et al. Positive Electrode 1 having a Co ratio of 0.6 ($d=0.6$) may overlap the claims of the present application in the value of d , but its Ni and Mn ratios of 0.1 and 0.3, respectively, make a $|b-c|$ value of 0.2 which is largely different from the range as claimed (e.g., and $b > c$). A Mn ratio greatly in excess of a Ni ratio does not produce "a single-phase structure". This is clear from the explanation in page 13, line 9 to page 14, line 11 of the present specification, which is reproduced below (with underlining included for emphasis).

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For obtaining the advantages of the invention in a preferred manner, the constitutional ratio between manganese and nickel is a crucially important matter. Namely, the Mn/Ni element ratio in the invention is regulated so that the value of $|b-c|$ (absolute value of the difference between the value of b and the value of c) is 0.05 or smaller, preferably smaller than 0.03, whereby advantages of the invention are produced remarkably. Namely, a positive active material having high high-rate discharge performance and a high discharge capacity is obtained. This active material further has excellent charge/discharge cycle characteristics. When $|b-c|$ exceeds 0.05, this means an unstable structure. In case where c is too large, i.e., nickel is contained in excess, this does not considerably influence the charge/discharge capacity itself because an LiNiO_2 phase generates. In this case, however, thermal stability in the final stage of charge becomes considerably poor. In case where b is too large, i.e., manganese is contained in excess, an impurity phase which is not of the $\alpha\text{-NaFeO}_2$ type, such as LiMn_2O_3 , is formed. Since this impurity phase undergoes no electrode reactions in a 4-V region, the formation thereof reduces the capacity of the active material. Furthermore, the presence of the impurity phase reduces the crystallinity of the composite oxide, resulting in a larger decrease in capacity. Consequently, the proportions of the constitutional nickel and manganese elements in the chemical composition are desirably in such a range that $|b-c| \leq 0.05$, preferably $|b-c| < 0.03$.

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Claims 7-10 would have been neither anticipated by, nor obvious over Positive Electrodes 3 and 8 of Nakanishi et al, for the same reasons as those stated above against Fujimoto. In particular, claims 8 and 10 of the present application would not have been obvious, since the limitation " $0.8 \leq d < 1$ " makes it possible to achieve a particularly outstanding improvement in high-rate discharge performance value (%) and a particularly outstanding reduction in high-temperature charge capacity increase (%), as is evident from Figs. 2 and 3.

Claims 15-18, which further limit claims 7-10, would have been neither anticipated by, nor obvious over Nakanishi et al, either. For additional results of claims 15-18 over those of claims 7-10, i.e. the technical meaning of the limitation " $d \leq 0.833$ ", reference may be made to page 11, line 5 from bottom to page 16, line 8 of Applicant's arguments included in the Amendment filed herein on February 28, 2007.

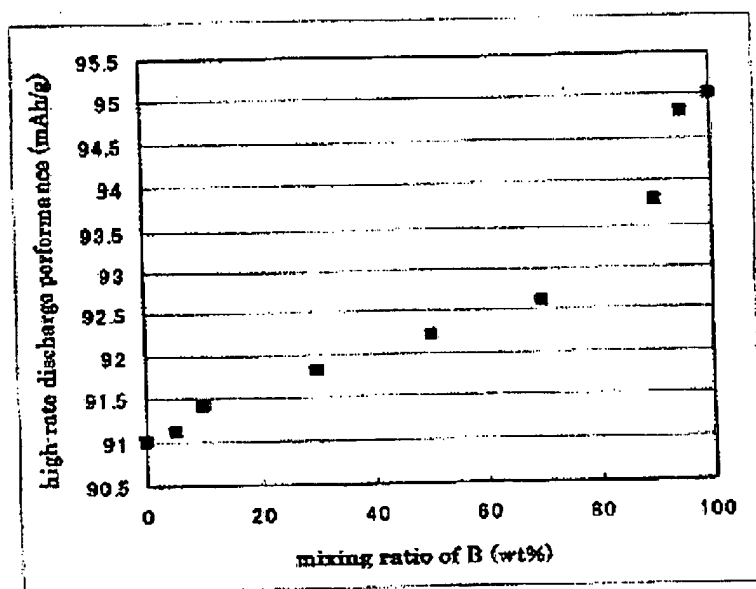
Further, even assuming (arguendo) that claims 11, 12, 21 and 22 of the present application recite a mixture of $\text{Li}_{(1+z)}\text{Mn}_2\text{O}_4$ (A) and $\text{Li}_a\text{Mn}_b\text{Ni}_c\text{Co}_d\text{O}_e$ (B) in common with Nakanishi et al, the limitations " $|b-c| \leq 0.05$ " and " $0.6 \leq d < 1$ " to (B) (claims 11 and 21) or the limitations " $|b-c| \leq 0.03$ " and " $0.8 \leq d < 1$ " to (B) (claims 12 and 22) make it possible to attain another object of the claimed invention. That is, the present Application provides that "[a]nother object of the invention is to provide a non-aqueous electrolyte battery which retains the high thermal stability characteristic of lithium-manganese oxides having a spinel structure, has a high energy density and excellent high-rate discharge performance, is inhibited from suffering self-discharge, and has excellent storage performance.", and ensure, in particular, that the high-rate discharge performance can be significantly improved by selecting a mixing ratio of "5:95 to 10:90". (Application at page 7, line 22 to page 8, line 2).

The following is a transcription of the numerical values in "Table 3" of the specification, and the following chart is a plotting thereof. As will be apparent from the chart, an inflection is observed at a mixing ratio of (B) at 90%. Thus, an unexpected effect that the high-rate discharge performance can be significantly improved by selecting a mixing ratio of (B) at 90 to 95%.

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mixing ratio of B (wt%)	high-rate discharge performance (mAh/g)
0	91
5	91.1
10	91.4
30	91.8
50	92.2
70	92.6
90	93.8
95	94.8
100	95



(From pages 17-18 of the arguments included in the Amendment filed with the U.S.P.T.O. on

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February 28, 2007)

Nakanishi is intended for improving "charge-discharge characteristics under conditions involving repetitions of charging and discharging with a great current within a short period of time, i.e., power characteristics" (e.g., see Nakanishi at [0008]), and employs "a mixture of a lithium-nickel-cobalt-manganese composite oxide represented by the formula $\text{LiNi}_{(1-x-y)}\text{Co}_x\text{Mn}_y\text{O}_2$ wherein $0.5 < x+y < 1.0$ and $0.1 < y < 0.6$ and a lithium-manganese composite oxide represented by the formula $\text{Li}_{(1+z)}\text{Mn}_2\text{O}_4$ wherein $0 \leq z \leq 0.2$ " (e.g., see Nakanishi at [0020]), " $\text{Li}_a\text{Mn}_b\text{Ni}_b\text{Co}_{1-2b}\text{O}_2$ (wherein a is $0 \leq a \leq 1.1$ and b is $0 < b \leq 0.5$)" (e.g., see Nakanishi at [0010]). However, all of the compounds employed as examples of $\text{LiNi}_{(1-x-y)}\text{Co}_x\text{Mn}_y\text{O}_2$ wherein $0.5 < x+y < 1.0$ and $0.1 < y < 0.6$ depart from the scope of the composition as claimed in the present application, as shown in TABLE 1 and as mentioned above.

An object of the claimed invention cannot be attained by any material containing $\text{Li}_a\text{Mn}_b\text{Ni}_c\text{Co}_d\text{O}_e$ (B) failing to satisfy the requirements of a, b, c, d and e as recited, for example, in claims 11, 12, 21 and 22, as is evident from Table 3 in the specification of the present application which shows the very low high-rate discharge performance of Comparative Example 6 employing oxide (B) in which $d=0.5$.

Therefore, Applicant respectfully submits that claims 11, 12, 21 and 22 are allowable (e.g., at least as being directed to "a selection invention"), insofar as Nakanishi neither teaches nor suggests that the limitations of claims 11, 12, 21 and 22 make it possible to attain an object of the claimed invention.

In addition, the Examiner alleges on page 4 of the Office Action that the oxide of Nakanishi would inherently include a single-phase structure belonging to space group R3-m.

However, as noted above, even assuming (arguendo) that the products obtained by using the production method as described in Fujimoto or Nakanishi may at least partially include "a structure belonging to space group R3-m", Applicant would point out that the present Application describes an exemplary aspect of the claimed invention stating "[a]s a result of examination by X-ray diffractometry, the powder obtained was found to have a single-phase structure belonging to space group R3-m". In particular, in the working examples, the composite

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oxide of the claimed invention has a high purity to such an extent that whole of composite oxide may be recognized as "a single-phase structure belonging to space group R3-m" in view of the "result of examination by X-ray diffractometry", even when the composite oxide includes the other structure as an impurity.

That is, an exemplary aspect of the claimed invention may eliminate a low purity composite oxide including a structure other than "a single-phase structure belonging to space group R3-m" to such an extent that a peak belonging to the other structure is recognized in a group of peaks observed as a result of examination by X-ray diffractometry. Nowhere is this taught or suggested by the cited references.

Therefore, Applicant respectfully submits that there are features of the claimed invention that are not taught or suggested by Nakanishi. Therefore, the Examiner is respectfully requested to withdraw this rejection.

III. FORMAL MATTERS AND CONCLUSION

In view of the foregoing, Applicant submits that claims 7-26, all the claims presently pending in the application, are patentably distinct over the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview.

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The Commissioner is hereby authorized to charge any deficiency in fees or to credit any overpayment in fees to Attorney's Deposit Account No. 50-0481.

Date: 2/23/09

Respectfully Submitted,



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CERTIFICATE OF FACSIMILE TRANSMISSION

I hereby certify that the foregoing was filed by facsimile with the United States Patent and Trademark Office, Examiner Chuo, Tony Sheng Hsiang, Group Art Unit # 1795 at fax number (571) 273-8300 this 23rd day of February, 2009.



Phillip E. Miller

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